

REMARKS

In the current, March 6, 2008 final Office Action, claims 3 - 11 and 13 - 21 were noted as pending in the application, and all claims were rejected. By this response, no claims have been canceled, no claims have been amended, and no new claims have been added. Thus, claims 3 - 11 and 13 - 21 are pending in the application. The rejections of the Office Action are traversed below, and reconsideration of the pending claims is respectfully requested.

Interpretation of Claims 3, 4, and 6 - 11

In item 2, on pages 2 - 3 of the Office Action, the Office Action explains its introduction of a "Claim Interpretation" section in the prior, December 22, 2006 Office Action. The Applicant notes with appreciation that the "Claim Interpretation" has been withdrawn in the present Office Action.

Rejection of Claims 3 - 11 and 13 - 21 under 35 U.S.C. § 103(a)

In item 4, on pages 6 - 12 of the Office Action, Claims 3 - 11 and 13 - 21 stand rejected under 35 U.S.C. § 103(a) in view of the combination of U.S. Patent No. 5,287,292 to Kenny et al.; U.S. Patent No. 4,602,872 to Emery et al.; and U.S. Patent No. 5,233,161 to Farwell et al. This rejection is respectfully traversed.

Under a rejection based on 35 USC § 103(a), the Examiner bears the burden of showing a *prima facie* case of obviousness based upon the prior art. *In re Roufett*, 149 F.3d 1350, 1355, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998); *In re Fritch*, 23 U.S.P.Q.2d 1780, 1783-84 (Fed. Cir. 1992); MPEP § 2142. To establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a), three basic criteria must be met: (1) the scope and content of the prior art are to be determined, (2) differences between the prior art and the claims at issue are to be ascertained, and (3) the level of ordinary skill in the pertinent art is resolved. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18, 86 S.Ct. 684 (1966). Against this background, the obviousness or nonobviousness of the subject matter is determined. *Id.*

When applying Section 103(a), four tenets of patent law must be adhered to: (1) the claimed invention must be considered as a whole; (2) the references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; (3) the references must be viewed without the benefit of impermissible hindsight; and (4) a

reasonable expectation of success is the standard with which obviousness is determined. *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 (Fed. Cir. 1986). Moreover, mere identification of each claimed element in the prior art is insufficient to negate patentability. *In Re Rouffet* at 1357. Instead, there “must be a teaching or suggestion within the prior art, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources of information, to select particular elements, and to combine them in the way they were combined by the inventor.” *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 536 (Fed. Cir. 1998). Otherwise, sophisticated scientific fields would rarely, if ever, experience a patentable technical advance. *In re Rouffet* at 1357.

An Examiner’s analysis concluding that it would have been obvious to combine known elements in the prior art should be made explicit. *KSR Int’l v. Teleflex, Inc.*, 127 S.Ct. 1727, 1741, 82 U.S.P.Q.2d 1385 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). It is important to identify the benefit/reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed invention does. *KSR Int’l* at 1741, 1744. To establish a *prima facie* case of obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 U.S.P.Q. 580, 582 (C.C.P.A. 1974); MPEP § 2143.03. In the absence of a proper *prima facie* case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. *In re Roufett* at 1355.

The Art of Record Fails to Disclose a Plurality of Sensors Each Placed in One of a Plurality of Different Locations on an Integrated Circuit, as Recited in Independent Claims 3 and 10, and the Art of Record Also Fails to Disclose Sensing Temperature at a Plurality of Different Locations on an Integrated Circuit, as Recited in Independent Claims 14 and 20

On pages 6 - 10 of the Office Action, claims 3, 10, 14, and 20 are rejected in view of the combination of Kenny, Emery, and Farwell references. Independent claims 3 and 10 recite an integrated circuit with a plurality of thermal sensors each placed in one of a plurality of different locations on the integrated circuit. Independent claims 14 and 20 recite sensing temperature at a plurality of different locations on an integrated circuit.

The Office Action concedes that Kenny does not expressly suggest using a plurality of thermal sensors. The Emery reference is introduced to allegedly disclose the use of a

plurality of temperature sensors on an integrated circuit. However, Emery is directed to monitoring water temperature after the water has been discharged from cooling a large electric generator, with absolutely no reference to an integrated circuit (see Emery at abstract, Col. 1, lines 7 - 16; Col. 2, lines 17 - 22; Col. 3, lines 49 - 53). Further, Emery discloses a single sensor per discharge tube, not a plurality of sensors on an integrated circuit (Emery at Col. 3, lines 49 - 53; Col. 4, lines 47 - 52).

Additionally, the Office Action admits that neither the Kenny reference nor the Emery reference teach placing thermal sensors on an integrated circuit. The Farwell reference is introduced as allegedly disclosing placing a temperature sensor on an integrated circuit. However, the temperature sensing component of Farwell is part of a burn-in heating circuit for purposes of circuitry burn-in testing without use of burn-in ovens (see Farwell at Col. 1, lines 7 - 10; Col. 2, lines 32 - 39 and lines 52 - 57). Voltage is provided to the burn-in circuit until the temperature reaches the desired burn-in temperature (Farwell at Col. 3, lines 58 - 62). Further, none of the references disclose sensing temperatures at a plurality of different locations on an integrated circuit, as recited in claims 14 and 20, nor does the Office Action cite to any of its references as disclosing such a feature.

Throughout pages 6 - 8, the Office Action admits that none of the references teach each of the elements recited in independent claims 3, 10, 14, and 20. For example, independent claims 3 and 10 recite a plurality of sensors each placed in one of a plurality of different locations on an integrated circuit, and claims 14 and 20 recite sensing temperature at a plurality of different locations on an integrated circuit. As admitted by the Office Action, Kenny discloses a single temperature sensor located near an integrated circuit (emphasis added). Farwell discloses a single temperature sensor as part of a burn-in circuit located on an integrated circuit (emphasis added) (see Farwell at Col. 2, lines 52 - 57), and Emery does not disclose temperature sensors on integrated circuits at all and instead discloses a single temperature sensor in each of a plurality of water cooling tubes located downstream from an electric generator (see Emery at Col. 2, lines 17 - 22; Col. 3, lines 49 - 53) (emphasis added).

Therefore, none of the references disclose a plurality of thermal sensors placed at different locations on an integrated circuit nor sensing temperature at a plurality of different locations on an integrated circuit, as recited by the independent claims.

The Art of Record Fails to Disclose Generating an Interrupt if a Calculated Average Temperature Exceeds a Stored Threshold Temperature, as Recited in Independent Claims 3 and 14, and the Art of Record Also Fails to Disclose Displaying Information Regarding a Calculated Average Temperature to a User of an Integrated Circuit, as Recited in Independent Claims 10 and 20

Independent claims 3 and 10 recite an integrated circuit with an averaging mechanism to calculate an average temperature from the plurality of sensors. Independent claims 14 and 20 recite calculating an average temperature from the plurality of different sensed temperatures. Claims 3 and 14 further recite generating an interrupt if the calculated average temperature exceeds a threshold temperature. Claims 10 and 20 recite the additional feature of displaying information regarding the calculated average temperature to a user of the integrated circuit.

The Office Action concedes that Kenny does not expressly suggest “an averaging mechanism as recited by the claims.” The Emery reference is then introduced to allegedly disclose calculating an average temperature from a plurality of sensors. While Kenny has been distinguished in the Office Action as failing to disclose any averaging mechanism, the Office Action cites to both Kenny and Emery as generating an interrupt or an alarm if a threshold temperature is exceeded. However, claims 3 and 14 recite generating an interrupt if the calculated average of the plurality of temperatures exceeds a threshold temperature. As admitted by the Office Action, Kenny discloses no such plurality of temperatures nor calculating the average of any such temperature; so Kenny cannot generate an interrupt if the calculated average of the temperatures exceeds a threshold temperature. While Emery does disclose averaging the temperature readings from a sensor in each of a plurality of water tubes, Emery obtains the average temperature for the tubes for comparing the average against subsequent sensor readings themselves, not against a threshold temperature. (Emery at abstract; Col. 2, lines 22 - 25; Col. 4, lines 47 - 64). Therefore, Emery cannot be said to generate an interrupt if the calculated average temperature exceeds a threshold temperature.

Claims 10 and 20 recite the additional feature of displaying information regarding the calculated average temperature to a user of the integrated circuit. The Office Action cites to Emery at Col. 8, lines 11 - 28 as allegedly disclosing this feature. However, the cited portion of Emery merely discloses flashing a value or displaying a change in color if any single sensor value exceeds a predetermined value (emphasis added).

Even the Combination of the Art of Record as Suggested in the Office Action Fails to Disclose the Elements if Independent Claims 3, 10, 14, and 20

Throughout pages 6 - 8, the Office Action admits that none of the references teach each of the elements recited in independent claims 3, 10, 14, and 20 and then concludes that the Kenny, Emery, and Farwell combination teaches all of the elements recited in claims 3, 10, 14, and 20. The Applicant respectfully disagrees that the Kenny, Emery, and Farwell combination necessarily teaches each and every element of independent claims 3, 10, 14, and 20.

Assuming for purposes of argument that the integrated circuits of Kenny and Farwell were to be combined, at best, the Kenny/Farwell combination would teach an integrated circuit with a single temperature sensor on or near the integrated circuit. Such a combination does not disclose the recited elements of independent claims 3 and 10 of a plurality of thermal sensors each placed in one of a plurality of different locations on the integrated circuit nor the method of claims 14 and 20 of sensing temperature at a plurality of different locations on an integrated circuit -- as admitted by the Office Action. If the multi-ton, water-cooled electric generator of Emery were to be added to the mix, the result might be a temperature sensor reading the temperature of the cooling water downstream from the circuit. Accordingly, neither a two-way combination or even the three-way combination of the Office Action teaches or even suggests a plurality of thermal sensors placed on an integrated circuit or sensing temperature at a plurality of different locations on an integrated circuit, as recited in independent claims 3, 10, 14, and 20. In short, there are few ways to combine the integrated circuit of Kenny with the high temperature burn-in circuit of Farwell and further with the multi-ton, water-cooled electric generator of Emery; and none of the combinations would teach the elements recited in claims 3, 10, 14, and 20 -- nor has the Office Action explained how such a 3-way combination can possibly be made in the manner suggested by claims 3, 10, 14, and 20.

There is no Reason a Person of Ordinary Skill in the Art of Integrated Circuits Would Make the Combination of Art as Suggested in the Office Action

Throughout pages 6 - 8, the Office Action admits that none of the references teach each of the elements recited in independent claims 3, 10, 14, and 20 and then concludes that not only does the Kenny, Emery, and Farwell combination teach all of the elements recited in claims 3, 10, 14, and 20, but also that it would have been obvious to combine the teachings of these three reference to render obvious the elements recited in claims 3, 10, 14, and 20. The Applicant respectfully disagrees -- both that the Kenny, Emery, and Farwell combination teaches each and every element of independent claims 3, 10, 14, and 20 and further that it would have been obvious to a person of ordinary skill in the art of integrated circuits to make such a combination.

A rejection of obviousness under 35 U.S.C. § 103 requires that the Office Action identify a reason that would have prompted a person, of ordinary skill in the art of the claimed subject matter, to combine the references in the same manner as done in the claims. *KSR Int'l* at 1741, 1744. Also, the Office Action's analysis concluding that it would have been obvious to combine known elements in the prior art must be made explicit. *Id.*

The Applicant notes that the Kenny patent is directed to a thermal sensor for monitoring and controlling the temperature of an integrated circuit while in operation (see Kenny at abstract). In contrast, while Farwell is also directed to integrated circuits, the Farwell reference provides for temperature sensing with a single sensor in a burn-in circuit during circuit reliability testing to ensure that a circuit is operating above a given temperature such that burn-in testing of the circuit can proceed without the use of burn-in ovens (Farwell at Col. 1, lines 7 - 10; Col. 2, lines 32 - 37; Col. 3, lines 55 - 65). Kenny discloses a maximum operating temperature for the circuit to be 50° C (Kenny at Col. 2, lines 17 - 26). The Farwell system, intended to test the circuit for failure, sets a target temperature to be achieved during burn-in testing to be a minimum of 125° C and to expose the circuit to that temperature for an extended period of time (Farwell at Col. 1, lines 21 - 29). There is no reason the person of ordinary skill in the art of integrated circuits, in possession of the Kenny system for monitoring and controlling the temperature of an integrated circuit while in operation, would look to the oven-less burn-in testing system of Farwell that heats integrated circuits to more than twice the operating temperature that is acceptable under the Kenny

system -- nor has the Office Action presented any such reason other than to assert, without support, that both patents are drawn to the broad region of thermal measurement and control. Further, Farwell does not cure the deficiencies of Kenny in that neither reference teaches a plurality of thermal sensors on an integrated circuit, or sensing temperature at a plurality of different locations on an integrated circuit.

The Emery reference is directed to art that is even farther removed. In contrast to the integrated circuit subject matter of Kenny and Farwell, Emery is directed to cooling a multi-ton electric generator with water, wherein a single temperature sensor is positioned in each of a plurality of water tubes, located downstream from the generator, to derive the temperature of the cooling water being discharged after cooling the generator (see Emery at Col. 1, lines 11 - 16; Col. 2, lines 17 - 22). The Office Action introduces Emery to allegedly teach a plurality of temperature sensors. While Emery does teach a plurality of temperature sensors, any similarity between Emery and the recited elements of claims 3, 10, 14, and 20, or to either Kenny or Farwell, ends at that point. The sensors of Emery are not positioned on a single integrated circuit for sensing the temperature of that circuit, as recited in claims 3 and 10, nor are they positioned to sense temperatures at a plurality of different locations on an integrated circuit, as recited in claims 14 and 20. Instead, Emery discloses a single temperature sensor being provided for each of a plurality of water cooling discharge tubes for a multi-ton electric generator, each for sensing the temperature of the water in a particular discharge tube, not the generator itself (Emery at Col. 3, lines 50 - 54).

The Applicant respectfully asserts that a person of ordinary skill in the art of integrated circuits would have no reason to look at a reference discussing a multi-ton electric generator that is cooled by water to determine why or how to place a plurality of thermal sensors on an integrated circuit. Nowhere has the Office Action explicitly identified why a person of ordinary skill in the art of integrated circuits would look to a reference discussing a water-cooled, multi-ton electric generator for the placement of a plurality of thermal sensors on an integrated circuit.

Further, a person of ordinary skill in the art of small, even tiny, integrated circuits, even with knowledge of a Kenny/Farwell combination, would have absolutely no reason to look to electric generating systems, where the device to be cooled can weight hundreds of tons and relies on water for cooling, for solutions for thermal sensing. First, the Kenny and Farwell patents disclose sensing of the temperature of an integrated circuit with a single

temperature sensor, with no reason to add the enormous, additional components of a water-cooled electric generator system to the circuit. Second, sensing the down-stream cooling water of Emery has no application to the electronic integrated circuit environment of Kenny and Farwell, and the Kenny/Farwell artisan would have no reason to look to Emery's water cooling system for electric generators. Finally, at best, and by stretching, the Kenny-Farwell-Emery combination could disclose an integrated circuit having a water cooling system wherein the integrated circuit has a single temperature sensor located near, on, or downstream from the circuit.

The Office Action, at pages 4 - 5, asserts that the relevant art recited in claims 3, 10, 14, and 20 and in each of the references is the field of thermal measurement and control. The Office Action admits that Emery does not teach in the art of integrated circuits and further admits that Emery is directed to a different end product than either the application, Kenny, or Farwell. The Office Action then proceeds to conclude that such differences do not matter because "the teachings relied upon in the rejection related to the generic and broadly applicable concept that taking a plurality of measurements and averaging the result is better than taking a single measurement and blindly hoping that the single measurement is accurate." However, the Office Action's own Kenny and Farwell references refute the unsupported "blind hope" conclusions of the Office Action in that both relied-upon references of Kenny and Farwell disclose a single temperature sensor in teachings expressly related to the integrated circuits subject of the present application (see Kenny at Col. 1, lines 47 - 64; Farwell at Col. 2, lines 52 - 57). Furthermore, the unsupported and conclusory "generic and broadly applicable" reasoning presented in the Office Action does not satisfy *KSR Int'l's* requirement to identify the benefit/reason that would have prompted a person of ordinary skill in the art of the relevant field to combine the elements in the way the claims do. In short, the conclusion of the Office Action, that any "generic and broadly applicable" benefit is sufficient to show obviousness completely and improperly negates the *Graham* and *KSR* requirement that the obviousness or nonobviousness of the subject matter of the claims must be determined in view of the level of ordinary skill in the pertinent art. When "generic and broadly applicable" concepts are broadly brushed across claim limitations, as in the present rejection, any possible collection of elements and references can be used, as in the present Office Action, to reject claims, contrary to the requirements of 35 U.S.C. § 103 and to

the legal standard for obviousness rejections as set forth in at least the caselaw presented above.

The Examiner is required to explicitly explain the reasons why a person of ordinary skill in the art would have a reason to combine the teachings of the Kenny, Farwell, and Emery patents to render the claimed elements obvious. The Office Action fails to explain why a skilled artisan would have a reason to combine the teachings of Kenny, Emery, and Farwell to allegedly render each and every element of claims 3, 10, 14, and 20 obvious. For example, as described above, there is no showing why a person of ordinary skill in the art could or would combine these three references to teach an integrated circuit having a plurality of thermal sensors placed at a plurality of different locations on an integrated circuit, as recited in claims 3 and 10. Without a plurality of thermal sensors located at a plurality of locations on an integrated circuit, it is respectfully submitted that the claimed averaging mechanism and average temperature calculation are also not taught by the references, alone or in combination. Similarly, there is no showing why a person of ordinary skill in the art could or would combine these references to teach sensing temperatures at a plurality of different locations on an integrated circuit, as recited by claims 14 and 20. Without sensing temperatures at a plurality of different locations on an integrated circuit, it is respectfully submitted that the claimed averaging mechanism and average temperature calculation are also not taught by the references, alone or in combination.

For at least these reasons, independent claims 3, 10, 14 and 20 are believed to be patentably distinguishable over the Kenny, Farwell, and Emery references, either taken alone or in combination. Accordingly, it is respectfully requested that the rejection of claims 3, 10, 14, and 20 be withdrawn.

Claims 4 - 9 depend from claim 3 and include all the features of that claim plus additional features. Therefore, for at least the reasons set forth above with respect to claim 3, it is submitted that claims 4 - 9 patentably distinguish over the Kenny, Farwell, and Emery documents, and withdrawal of the rejection of claims 4 - 9 is respectfully requested.

Claims 11 and 13 depend from claim 10 and include all the features of that claim plus additional features. Therefore, for at least the reasons set forth above with respect to claim 10, it is submitted that claims 11 and 13 patentably distinguish over the Kenny, Farwell, and Emery documents, and withdrawal of the rejection of claims 11 and 13 is respectfully requested.

Claims 15 - 19 depend from claim 14 and include all the features of that claim plus additional features. Therefore, for at least the reasons set forth above with respect to claim 14, it is submitted that claims 15 - 19 patentably distinguish over the Kenny, Farwell, and Emery documents, and withdrawal of the rejection of claims 15 - 19 is respectfully requested.

Claim 21 depends from claim 20 and includes all the features of that claim plus additional features. Therefore, for at least the reasons set forth above with respect to claim 20, it is submitted that claim 21 patentably distinguishes over the Kenny, Farwell, and Emery documents, and withdrawal of the rejection of claim 21 is respectfully requested.

Summary

In summary, the Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness against claims 3 - 11 and 13 - 21. More specifically, the Examiner has not shown how or where the prior art teaches or suggests all the claimed limitations. As discussed above, even the combination of the references fails to teach all of the features recited in claims 3 - 11 and 13 - 21. Further, the Examiner has failed to explicitly identify why a person of ordinary skill in the art would combine the Kenny, Farwell, and Emery references together in the manner recited in the pending claims. Accordingly, the Applicant respectfully requests the rejection of claims 3 - 11 and 13 - 21 be withdrawn.

If any fees are required in connection with this RCE and Response, please charge such fee to Bingham McCutchen, LLP Deposit Account No. 50-4047.

Respectfully submitted,
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